

**Alberta Government Action Plan
on
Climate Change**

1997-98 Progress Report

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Executive Summary

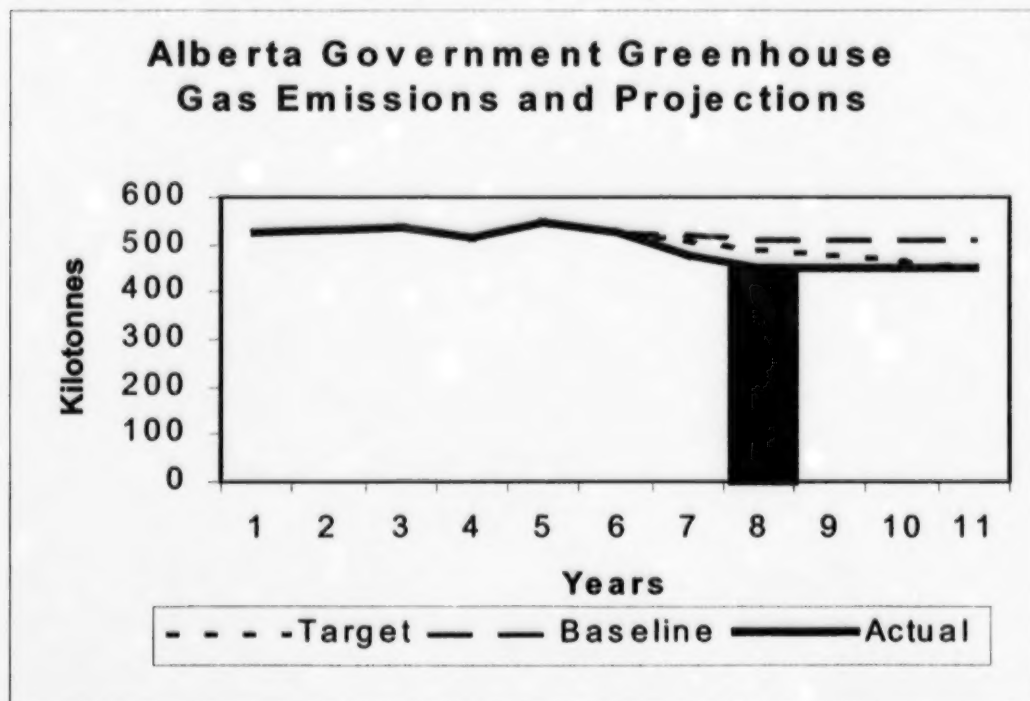
The Government of Alberta submitted an Action Plan for Canada's Climate Change Voluntary Challenge and Registry Program in October 1995. The Action Plan focussed on measures that will directly result in reductions of greenhouse gas emissions from Alberta government operations over a three-year period.

The Government of Alberta submitted its first Progress Report in October 1996. The Progress Report described the organisation established to deliver on the plan, the 1990 to 2000 baseline, a list of performance indicators, the target for the year 2000, and the cost-effective actions taken during the first year. The overall target is to reduce emissions by 14.1 per cent from 1990 levels by the year 2000.

This is the Government of Alberta's third annual

Progress Report. This Progress Report describes the actions taken and the results from these efforts. Total emissions of CO₂ equivalent from all government operations decreased from 476 kilotonnes in 1996 to 449 kilotonnes of CO₂ equivalent in 1997, a 5.7 per cent reduction. These reductions exceed the adjusted target of 31 kilotonnes of CO₂ equivalent set for 1997. All three sources of emissions contributed to these reductions. The contribution of each emission source to the 27 kilotonnes of CO₂ equivalent reduction was: buildings, 26 kilotonnes; waste, 1 kilotonne; and transportation, 0 kilotonnes.

The 1997 emissions of 449 kilotonnes of CO₂ equivalent are 14.6 per cent below 1990 levels. The reductions exceed our 1997 target and our overall target for 2000 of 452 kilotonnes of CO₂ equivalent by 3 kilotonnes of CO₂ equivalent.



1.0 Background on Action Plan

The Government of Alberta submitted an Action Plan for Canada's Climate Change Voluntary Challenge and Registry Program in October 1995. The Action Plan focussed on measures that will directly result in reductions of greenhouse gas emissions from Alberta government operations over a three-year period. Greenhouse gas emissions related to Alberta government operations are mostly carbon dioxide. Emissions of methane, nitrous oxide and other greenhouse gases are less significant. The three major sources of carbon dioxide, in order of significance — and their potential for reducing emissions are:

- 1) energy used in buildings, mostly natural gas and electricity,
- 2) waste,
- 3) operation of vehicles in the government's transportation fleet.

In 1990, emissions of carbon dioxide from Alberta government operations were 526 kilotonnes or about half a per cent of the province as a whole. The Alberta government is showing leadership by taking cost-effective actions to reduce the Alberta government's own greenhouse gas emissions.

The Alberta government's Action Plan has seven objectives:

- implement actions that reduce greenhouse gas emissions related to Alberta government operations
- demonstrate the advantages of a voluntary approach
- take effective actions that save money
- profit from doing business in new ways
- show how others can take cost-effective action to reduce emissions
- share what we learn
- measure and report on cost-effective quantitative actions.

2.0 Summary of 1996-97 Progress Report

The Government of Alberta submitted its second annual Progress Report in September 1997. Total emissions of CO₂ equivalent from all government operations decreased by 9.6% from 527 kilotonnes to 476 kilotonnes. This reduction exceeded the target of 507 kilotonnes of CO₂ equivalent.

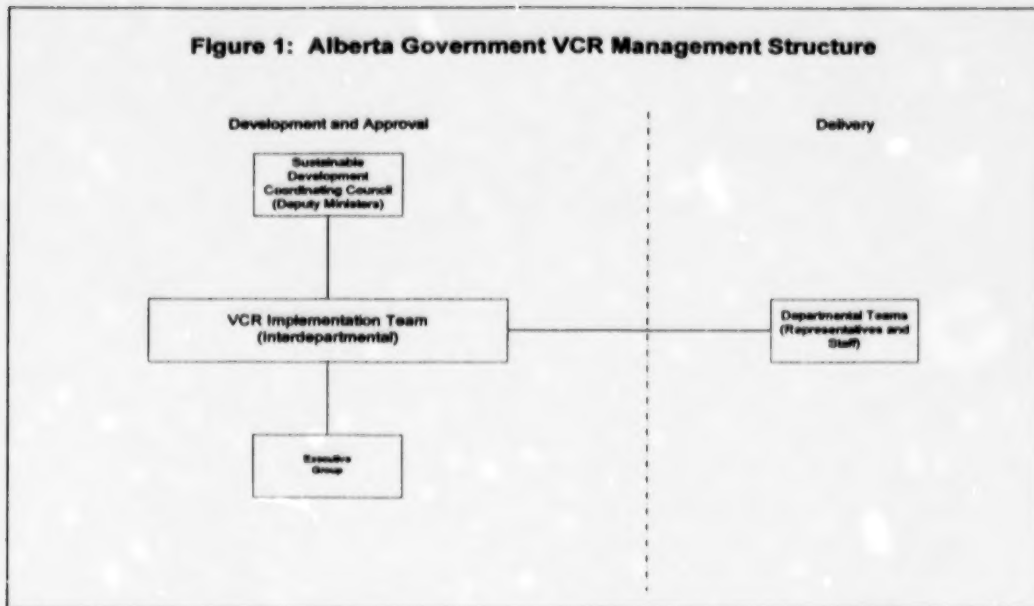
2.1 Organizational Development

The Action Plan required an organizing mechanism to plan, develop, deliver, advise and assess greenhouse gas emission reducing actions (see Figure 1). An Implementation Team was established in December 1995 with representation from all government departments. This team reports to a deputy minister level committee. The team provides overall co-ordination and direction for the Action Plan; ensuring integration of plans, actions and communication efforts.

In the past year, an executive group was established to develop options to reduce greenhouse gas from the key emission sources and present them to the VCR team. Members of this group included representation from five key departments: Energy, Environmental Protection, Public Works, Supply and Services, Transportation, and Advanced Education and Career Development.

Each department representative on the implementation team co-ordinates his/her department's involvement in the program by keeping senior executives informed, developing departmental teams, and encouraging staff to take specific actions. Some department representatives established teams of interested staff to facilitate their department's involvement in the program. Each department then develops further actions by assessing the results from

Figure 1: Alberta Government VCR Management Structure



initial actions and investigating other potential actions.

2.2 Baseline

A baseline was established for the period from 1990 to 2000 in the 1995-96 Progress Report. The baseline was adjusted in last years report. The adjustment was necessary due to a spreadsheet error in calculating the transportation emissions. The error increased transportation and overall emissions by 4 kilotonnes of CO₂ equivalent. The figure and table below have been adjusted for this error. For the 1990 to 1995 period, recorded historical data was used. When historical data was not available, reasonable extrapolations were made. Projections were made for 1996 to 2000 based on the Alberta government's three-year business plan.

Table 1 summarizes the total tonnes of CO₂ equivalent for all Alberta government operations and

for each emission source. Table 1 shows that emissions decreased to 517 kilotonnes of CO₂ in 1996 from 526 kilotonnes of CO₂ equivalent in 1990.

Emissions are projected to decrease 2.9 per cent to 511 kilotonnes of CO₂ equivalent by the year 2000, from 526 kilotonnes in 1990.

The largest emission source is energy use in buildings. Buildings represented 82.5 per cent of the 1990 total and are projected to increase to 90 per cent of total emissions in 2000, due to reductions in the other sources. Transportation is the second largest contributor but is declining and predicted to decline even further through continued privatization of the fleet. Some of these emissions will not be eliminated as they are only transferred to the private sector. Transportation emissions will drop from 12.7 per cent of the total in 1990 to 7.2 per cent in 2000. Finally, waste declines from 4.9 per cent of emissions in 1990 to 2.6 per cent in 2000.

Table 1: Alberta Government Baseline, Targets, and Actual Figures for Greenhouse Gas Emissions.

Emission Source		Kilotonnes of CO ₂ Equivalent										
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Buildings												
	Baseline	434	434	441	434	463	460	460	460	460	460	460
	Target							450	441	432	423	414
	Actual							427	401			
Transportation												
	Baseline	67	71	71	62	64	52	43	36	36	36	36
	Target							43	34	33	31	29
	Actual							36	36			
Waste												
	Baseline	26	25	22	20	17	15	14	14	14	14	14
	Target							13	12	11	10	9
	Actual							12	12**			
Totals	Baseline	526	530	534	516	544	527	517	511	511	511	511
	Target							507	488	476	464	452
	Actual							476	449			

*Columns may not add up due to rounding

**Actual figures not available, made the assumption that number will remain approximately the same.

2.3 Performance Indicators

To measure the success of emission reduction actions taken, a series of performance indicators were chosen. The overall indicator for the action plan will be *the percentage of CO₂ equivalent of reduced emissions from Alberta government internal operations*. Two indicators have been chosen for each major emission source. For buildings, the indicators are *percentage reduction of CO₂ equivalent emissions and energy consumed per square meter per year*. For waste, the indicators are *percentage reduction of CO₂ equivalent emissions and waste disposal per employee per year*. For transportation, the indicators are *percentage reduction of CO₂ equivalent emissions and total amount spent on travel per employee per year*. The percentage reduction figures for each source will be added to calculate the overall

action plan indicator.

2.4 Targets

Figure 3 and Table 1 show the target emission reductions, adjusted from the 1996-97 Progress Report to take account of the spreadsheet error. The target has not been changed therefore an additional 4 kilotonnes of emission reduction will be targeted for the transportation area. Emissions will be 14.1 per cent less in 2000 than in 1990. Emissions are targeted to be 452 kilotonnes of CO₂ equivalent in 2000, a 74 kilotonnes reduction between 1990 and 2000.

Targets have been established for each of the three emission sources. Based on these targets, an overall

reduction target for the action plan was set.

3.0 Accomplishments in 1997-98

3.1 Overall Results

Total emissions of CO₂ equivalent from all government operations decreased from 476 kilotonnes in 1996 to 449 kilotonnes of CO₂ equivalent in 1997, a 5.7 per cent reduction. These reductions exceed the target of 488 kilotonnes of CO₂ equivalent set for 1997. All three sources of emissions contributed to these reductions. The reductions from each source were: buildings, 26 kilotonnes; waste, 1 kilotonnes; and transportation, 0 kilotonnes.

Performance Measures - Overall

5.7 per cent reduction in CO₂ equivalent emissions

Figure 3: Total CO₂ Reductions

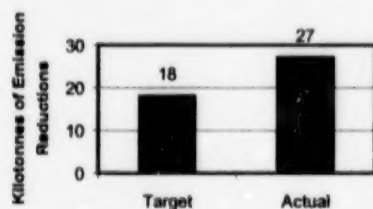
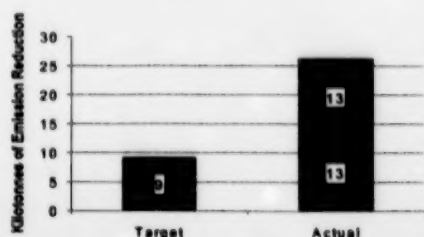


Figure 4: CO₂ Reductions: Buildings



3.2 Buildings

3.2.1 Results

Energy use was reduced in Alberta government buildings by 6.6 per cent during 1997. These savings result from energy efficiency actions (3.3 per cent), taken through energy performance contracting and improved maintenance and operation of the buildings, and a reduction in the total building space (3.3 per cent). These energy savings resulted in a reduction of 26 kilotonnes CO₂ equivalent, or 6.1 per cent. The energy savings were not adjusted for temperature, since 1997 was a warmer than average year. The percentage of CO₂ equivalent was less than energy use saved because the largest energy savings were from natural gas (6.5 per cent), with lower emissions, versus electricity (5.8 per cent), which has higher related emissions.

Alberta government buildings have become more efficient. Building-related emissions were reduced by 40 kilotonnes of CO₂ equivalent below the target for 1997 of 441 kilotonnes of CO₂ equivalent. If one assumes the percentage savings for electricity and natural gas is equivalent for area reduced and energy efficiency reductions, then 13 kilotonnes were reduced through energy efficiency efforts and 13 kilotonnes from reduced area. The target was exceeded by 4 kilotonnes even if the reduction resulting from reduced area is removed. Alberta government buildings have become more efficient. The building energy performance index (BEPI) has decreased from 1867.2 to 1807 megajoules per square meter in the past year.

Most of the energy efficiency gains came from changes in operation and maintenance of the

buildings. A Building Management Information System records energy use in all government buildings using data from gas and electric utility bills. Building managers use this information to track energy use in their buildings and to help identify opportunities for savings. The department of Public Works Supply and Services provides additional energy efficiency information to the managers and encourages energy efficiency operating practices. In addition, a number of measures with short-term paybacks have been taken using maintenance budgets.

Energy use savings resulted from energy performance contracts in specific buildings. Energy performance contracts were completed for the Haultain Building, the Alberta Research Council, and a group of nine buildings in the Lethbridge area. Savings from these buildings would be reflected in this year's reductions. Construction has begun on a retrofit project for twenty-two buildings in the Northwest region of the province. The auditing of the balance of the government's largest buildings is continuing. These preparations will lead to significant savings in future years.

Although it is difficult to assess, some reductions may have resulted from changes in staff habits. Department staff are continually educated about measures to reduce greenhouse gases through newsletters, e-mail and posters. In addition, prompts (labels with key messages) continued to be distributed throughout the government and placed on energy using equipment; such as light switches, computers, printers, and faxes. The prompts encourage staff to shut off lights, printers and computers when not in use and to use e-mail.

Performance Measures - Buildings

- **6.1 per cent reduction in CO₂ equivalent emissions**
- **Energy consumed per square meter decreased from 1867 to 1807 megajoules**

3.2.2 Specific Actions

- Lighting retrofits have been completed for the Alberta Vocational College, the Bowker Building, the Haultain Building, the Alberta Research Council, and the Lethbridge Building Group.
- Construction has commenced on the buildings in the Northwest area of the province.
- Designed a lighting retrofit for the Spy Hill Complex. Implementation costs: \$736,000. \$110,000 savings per year for a 6.7 year payback.
- Designed a lighting retrofit for the Neil Crawford Center in Edmonton. The implementation costs will be \$1,800,000 and result in a \$300,000 savings per year for a 6-year payback.
- The entire Department of Alberta Health has converted their office space to an open office concept and thereby reduced it's building space requirements. The process also improved space allocation, lighting, heating, and air circulation. The Department of Alberta Health has also become completely automated in terms of electronic mail which enables them to process communications without using more paper. They have reduced the number of photocopiers and have been able to more strategically place them.
- Alberta recently adopted new building and

fire codes that are effective June 1, 1998. Alberta Labour has worked in concert with the Safety Codes Council, associations, and the public to ensure the codes are current and consistent with national standards. They are also to be in line with the latest technology and procedures being used in industry. This will increase the energy efficiency of government buildings.

3.3 Waste

3.3.1 Results

Current figures for 1997 waste disposal rates per capita are unavailable. There is a one-year lag in the reporting of overall provincial waste reduction statistics, on which government facility statistics are based.

Alberta government waste disposal has declined from 7.7 kilotonnes to 7.0 kilotonnes, a 10 per cent decrease. This decline is entirely due to further reductions in government employees.

The waste disposal rate was assumed to be 277 kilograms per employee per year. Without 1997 waste disposal rates per employee, it is impossible to assess movement towards the target of reducing the emissions to 286 from 300 kilograms per employee per year. Per capita rates are expected to be lower than 277 kilograms for 1997.

The target for waste disposal emissions for 1996 was to reduce to 13.4 from 15 kilotonnes of CO₂

equivalent. Since emissions have been reduced to 12.6 kilotonnes of CO₂ equivalent, the target has been exceeded by 0.8 kilotonnes of CO₂ or 6.3 per cent.

Initiatives for this year were focussed on employee awareness. Posters with changeable inserts were distributed throughout the government departments. The information on the posters is used on a regular basis to communicate messages such as increase recycling and reuse of paper, increase use of e-mail, and prompts to encourage staff to shut off lights, printers and computers when not in use.

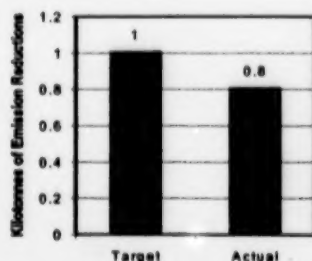
Performance Measures - Waste

- 10 per cent reduction in CO₂ equivalent emissions
- 1997 figure for kilograms per employee per year not available

3.3.2 Specific Actions

- A series of poster inserts were developed and distributed through the various government departments to serve as reminders on paper waste, food waste, proper vehicle maintenance, and recycling.
- An investigation to determine which waste collection companies provided on-site monitoring of waste disposal unfortunately proved unfeasible. A re-audit of the original 14 buildings audited for waste generation activity should be pursued in the next progress period.

Figure 5: CO₂ Reductions: Waste

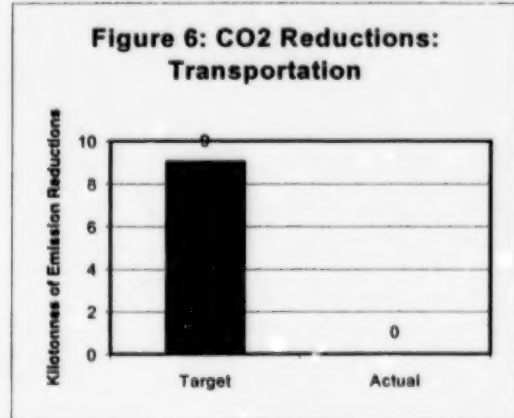


- A Buy Recycled fact sheet was developed for inclusion on the Action on Waste web site to encourage the purchase of recycled or otherwise environmentally friendly products. A Buy Recycled Guide is scheduled for completion in the fall of 1998.
- Two display units titled "Climate Change and You" have been developed to create/maintain an awareness of greenhouse gas issues. These are now scheduled to travel to the foyers of various government buildings throughout the province once the accompanying brochure is approved.
- Alberta Environmental Protection is developing an education program on climate change to help provincial staff, teachers, and students better understand the issues relating to climate change and to have them actively participate in greenhouse gas reduction activities.
- All Municipal Affairs offices now have recycling programs and in some cases have expanded the materials that are recyclable.
- The "Computers for Schools" program has seen increased activity this year, with the Departments of Education (K to 12), Public Works, and Energy providing over 500 otherwise surplus computers and components diverted for school use.
- Advanced Education and Career Development, which is focused on adult learning, provided 160 desktop units to the Alberta Vocational Colleges.
- The 22nd Annual Highway Clean up (May 2, 1998) was a success with over 11,500 volunteers collecting 51,000 bags of litter from over 6,600 km of

primary highway rights-of-ways.

3.4 Transportation

3.4.1 Results



Alberta government employees use many forms of transportation. Transportation emissions come from the government fleet of light duty vehicles, government aircraft, and the use of employee's private vehicles and flying in commercial aircraft. Overall emissions from transportation have decreased from 36.4 kilotonnes of CO₂ equivalent to 36.2 kilotonnes of CO₂ equivalent, a reduction of 0.5 per cent. This reduction exceeds the target of 31.6 tonnes of CO₂ equivalent set for 1997.

The light duty vehicle fleet increased slightly in number of vehicles (1.1 per cent) but decreased in overall kilometers driven (14.0 per cent), the change may be due to reduced use of vehicles for meeting travel due to an increased use of teleconferencing and e-mail. Light duty vehicles contributed 17.1 kilotonnes of CO₂ equivalent, down from 19.4 kilotonnes in 1996 and above the target of 15.5 kilotonnes of CO₂ equivalent.

All government owned aircraft increased their total mileage over the year. These hours include the emissions from 385.5 hours flown fighting fires in Alberta and British Columbia. Fire fighting is an activity that helps reduce the release of more greenhouse gas emissions. The mileage of government aircraft is also recorded. The baseline emissions from government aircraft were reported as 2.7 kilotonnes of CO₂ equivalent in the 1996-97 progress report. Government aircraft emissions increased to 3.0 kilotonnes of CO₂ equivalent, an increase of 10 per cent.

Greenhouse gas emissions from government owned aircraft have been reduced from 3.0 kilotonnes of CO₂ equivalent to 2.7 kilotonnes, a 10 per cent decrease over the year and 32.5 per cent below the target of 4 kilotonnes of CO₂ equivalent.

Government employees use their own personal vehicles for carrying out government business. The baseline emissions from personal vehicles were reported as 6.2 kilotonnes of CO₂ equivalent in the 1996-97 progress report. The actual emissions should have been 9.7 kilotonnes of CO₂ equivalent, due to an error in the spreadsheet. Personal vehicle travel decreased to 5.7 kilotonnes of CO₂ equivalent, a reduction of 8.0 per cent over the year.

Emissions from commercial aircraft used by government staff to attend meetings, trade shows, conferences and other business are tracked using the total dollars spent from travel expense forms and industry averages for fuel used. The actual emissions were 10.8 kilotonnes of CO₂ equivalent for 1996-97. When compared to the 7.6 kilotonnes recorded for the previous year, there was an increase of 29.6 per cent.

Performance Measures - Transportation

- 0.5 per cent reduction in CO₂ equivalent emissions
- Total amount spent on personal vehicle and commercial aircraft travel increased 10.6 per cent

3.4.2 Specific Actions

- Sponsored and organized vehicle emission clinics for government employees during energy awareness week.
- Piloted a project to assess the cost-effectiveness of co-ordinating travel on government aircraft. The project has the potential to reduce per passenger greenhouse gas emissions by increasing the number of passengers per flight.
- The Department of Justice replaced 29 older vehicles with current models and will be replacing 10 more in the fall of 1998. This change will contribute to the reduction of greenhouse gas emissions as new vehicles are more fuel-efficient and produce fewer emissions.

4.0 Supporting Activities

The Alberta government's Action Plan focuses on activities, which directly result in reduced emissions from government operations. However, many government activities influence others to reduce their emissions. These supporting activities contribute to the leadership role taken by the Alberta government in encouraging reducing greenhouse gas emissions throughout Alberta.

- The Department of Energy, in concert with

11 other government departments, participates in an interdepartmental working group on climate change. This group ensures that climate change information and activities are disseminated throughout the government.

- The Alberta government has taken a leadership role in the National Climate Change Process by Co-chairing the National Air Issues Co-ordinating Committee and co-manage the National Secretariat, which is in the process of developing a national implementation strategy on climate change.

4.1 Research Activities

Some of the research projects being supported by the Alberta government in the area of greenhouse gases include:

- Experimental and modelling program to evaluate the combustion, heat transfer, and pollutant characteristics of coal combustion in an oxygen medium with recycled CO₂ from flue gas. In 1994, Phase I of the pilot designed and constructed the facilities. Phase 2, in mid-1996, looked at combustion of coal in premixed, feed gas mixtures of O₂ and CO₂. Phase 3 began in October 1997 and looked at coal combustion in the cases of dry and wet flue gas recirculation, termed CO₂/O₂ recycle combustion. CO₂/O₂ recycle combustion is a potentially radical and novel approach that may help to reduce overall energy use and cost for CO₂ sequestration from fossil fuel-fired combustion process. The scheme promises to lead to the development of a new concept of a zero emissions power plant – where practically all of the particulate and gaseous effluents to the atmosphere are removed and disposed in a more environmentally benign way.
- Reclamation research programs, established by Syncrude and Suncor, are continuing with a focus on reclamation research. The program is also working on a greenhouse gas offset strategy using fast growing tree plantations. These plantations can serve to sequester atmospheric CO₂ in the short, medium, and long terms. Also, the plantations can be used as a feedstock to the cellulosic ethanol process for the production of ethanol as a blending component for gasoline thereby reducing the production of greenhouse gas emissions.
- Injection of CO₂ into deep Alberta coalbeds for the production of methane - Phase I of this scheme, which is now complete, involved assessment of the technical and economic feasibility of the scheme. The scheme was not considered economically efficient at the time; however, concurrent research in the area of tail gas recycling and/or amine scrubbing suggest significant reductions in delivery cost of CO₂ may be achievable. Phase II consists of a single well test and is a preliminary phase leading to the planning of a full-scale 5 spot pilot site, which will provide pilot-scale results that may lead to the establishment of commercial operation. It is hoped that future resources will include a synergy with the O₂/CO₂ recycling technology. For example, a coal-fired power plant would utilize the O₂/CO₂ combination furnace to produce a pure CO₂ flue gas that would be captured and used in the coal bed methane technology for the recovery of methane. This would result in a zero emission scenario.
- International Energy Agency Greenhouse Gas Research & Development programme - The Alberta government has provided on-going support toward the base-operating component of this International Research Initiative.
- CO₂ Utilization Action Plan for Alberta - This

project examined the potential of CO₂ in enhanced oil recovery in Alberta and was a follow-up to the 1994 AOSTRA study on this same subject. The results indicate that there may be specific opportunities available in Alberta warranting a more detailed examination, particularly if oil prices firm up and CO₂ use regulations in EOR can be redefined from a "more level playing field" perspective with other miscible fluids.

- Participation has been maintained with the Alberta Chamber of Resources in leading the "CO₂ Synergies Steering Committee". This committee is focused on developing commercial uses for CO₂ through research and development projects, including some of those described above.
- Government departments participate in at least two national initiatives dedicated to understanding possible climate change impacts to the prairie regions. The government is also supporting a specific adaptation study looking at urban environments and climate change.

4.2 Other Activities

- A consensus was reached in 1994 by government and stakeholders to move towards deregulation of the electric industry. The Electric Utilities Act was passed in 1995 and came into effect January 1, 1996 "to introduce more competition, and strengthen the Alberta Advantage" and was further advanced with the Electrical Utilities Amendment Act in 1998. Restructuring has removed what has been one of the major roadblocks to renewable generation in other jurisdictions: barriers to market access. The open access power pool ensures that existing renewable energy can participate and new projects can enter, and

non-discriminatory system access is provided to all sources of generation by the independent transmission administrator. Open access has also meant that higher efficiency, lower greenhouse gas emitting technologies, such as natural gas-fired combined cycle and cogeneration units, can now more effectively enter and compete in the new power market. Alberta developers have advised the government, that in their view, the next 1500 megawatts of new generation in Alberta will likely come from natural gas-fired cogeneration plants. Cogeneration provides both process steam and electricity off the same unit, resulting in energy conversion efficiencies of 65-95%.

- Last year, two new wind turbines were commissioned and are selling into the power pool.
- The Alberta government has provided significant support for the development of renewable power generation technologies. The Small Power Research and Development Act (SPR&D) of 1988, resulted in 18 operational renewable energy projects in Alberta, including the two largest operating wind farms in Canada. In 1997, 500 gigawatt hours (Gwh) of electricity was generated under this program. Assuming all power produced will offset an equal amount of fossil generation, this program represents a potential offset of approximately 0.4 MT (megatonnes) of CO₂, which the operators may legitimately take credit for. Over the next 20 years of the program, a total offset of 4.0 MT of CO₂ may be possible.
- Awareness of climate change issues has increased through information materials developed for the school curriculum, such as the 'Up in the Air' Workbook. The topics of greenhouse gases and global warming are

addressed in the curriculum for the compulsory courses of social studies (Grade 11) and in the new secondary science programs (Grades 7-12). The topic is also addressed in optional courses such as environmental and outdoor education (Grades 7-12) and in natural resource studies (career and technology studies, Grades 8-12).

- Other information and educational materials on climate change are made available to the public. Through the Environmental Citizenship Series, two publications have been produced, *A Matter of Degrees: a Primer on Global Warming* and *a Primer on Ozone Depletion*. In addition, the following materials are available: *Focus on Air Quality*, *Focus on Greenhouse Effect*, *Focus on Ozone Depletion*, *A Traveller's Guide to Spaceship Earth - Atmospheric Change and Personal Action*, and a poster titled *Up in the Air*.
- Farmers are provided information and education in the areas of energy use, energy efficiency, and alternative and renewable energy.
- All Municipal Affairs photocopiers have a power save mode and 95% have duplex capabilities. 99.5% of the paper used is recycled paper. Photocopiers are centrally located for shared use and users are encouraged to send large volumes to the Department Central Duplicating Service.
- Municipal Affairs Central Purchasing group continues to recommend and purchase environmentally friendly products.
- Alberta Environmental Protection along with FEESA, an Environmental Education Society, is working to help Alberta communities achieve their vision of sustainability. The Sustainable Communities Initiative (SCI), supports local communities through participation, public education and

communication. Over the past year, they have helped communities develop and implement action plans on waste, green spaces, transportation, sustainable housing and other grassroots efforts. As SCI continues to grow, the Department will continue its commitment to support local projects.

- Carbon sequestration was encouraged through programs to encourage planting trees. These programs include: *Shelter Belts (Farm)* — Trees and shrubs are sold to farmers to protect and beautify their farmsteads and *Arbour Day* — Seedlings of Colorado spruce, white spruce and lodgepole pine are given to schools for planting by children in Grades 1, 2 and 3. The total distribution of trees in 1997 was 438,113 trees.
- In February 1998, a workshop was jointly sponsored by the Alberta Forest Products Association, Alberta Environmental Protection, the Department of Energy, the Alberta Research Council, and Transalta Utilities. The objective was to explore forestry related greenhouse gas offset opportunities that may exist between the forestry and energy sectors.
- An intergovernmental team was established to educate and promote the idea of greenhouse gas offsets amongst government departments and the private sector. The team is looking at both domestic and joint implementation offsets. A number of technical papers and presentations were given over the past year.
- The Government of Alberta continued a long-term environmental program for the agri-food industry called the Alberta Environmentally Sustainable Agriculture (ASEA) Program. This program has provided funding to rural municipalities, agriculture organizations, agricultural processors, environmental groups, and aboriginal organizations to deliver

programs on environmentally sustainable agricultural production and processing to farmers, ranchers, and processors. Funding was also provided for soil and water quality monitoring, extension, and applied research to help industry become more environmentally friendly. The AESA program has an ongoing annual budget of \$5 million. Greenhouse gas emission reducing actions which will be encouraged and supported include reduced tillage, manure management, waste management, shelterbelts, pasture management, and woodlot management.

- Alberta Environmental Protection (AEP) is a funding partner in the implementation of the Post-Consumer Plastic Recycling Strategy. The strategy is being implemented by a multi-stakeholder group with representatives from the three levels of government, resin manufacturers, environmental and industry groups to help create a sustainable post-consumer plastics recycling and recovery industry within Alberta.
- The Government of Alberta passed an Order-in-Council authorizing amendments to the Beverage Container Recycling Regulation that removes the exemption for aseptic (juice and drink boxes) and wax paperboard containers (gable-top juice containers). Since September 1, 1997, aseptic (juice and drink boxes) and wax paperboard containers (gable-top juice containers) have been included in the deposit/refund beverage container system now administered by the Beverage Container Management Board. Early indications show a steady increase in the return for these types of containers in a relatively short period of time.
- In 1997, Alberta Environmental Protection (AEP) monitored air quality continuously in Edmonton (3 stations), Calgary (3 stations), Fort Saskatchewan, Fort McMurray, Fort

MacKay, Vegreville, and Beaverlodge. The air quality parameters monitored by AEP stations include carbon monoxide, dust and smoke, nitrogen oxides, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, carbon dioxide, ammonia, and particulates. The Index of the Quality of the Air (IQUA) was calculated at Edmonton, Calgary, Fort Saskatchewan, and Fort McMurray stations. The concentrations are converted into air quality ratings of *Good*, *Fair*, *Poor*, and *Very Poor*.

- In 1997, air quality was close to the same or better than the 10-year average at all monitoring stations (1986-1996).
- Good air quality was reported over 96% of the time at all monitoring stations in 1997.
- Since July 1/1997, within Public Affairs Office (PAO), the promotion of the VCR program has been mostly educational. For example, monthly E-mail messages regarding energy conservation measures have been issued and developed to promote conservation have been made visible.
- Over the last fiscal year, PAO saved approximately \$15,000 through the energy efficiency and waste management program. This program involved reducing lighting levels in office rooms, meeting rooms, and storage rooms. This also had a beneficial effect for people working on computers in offices, such as less headaches and eyestrain due to glare from computer screens. In addition to these activities, some of the money saved was from a reduction of wastes.
- Departmental staff have been encouraged to increase their use of teleconferencing and car pooling where possible. A work at home policy is not under development.

5.0 Workplan for 1998-99

The Alberta Government's Action Plan is dynamic. It will be updated regularly as new cost-effective actions are identified. Current commitments to action include:

- Aggressive program to audit all government buildings over 1000 square meters and follow up with cost-effective retrofits. The retrofits will be delivered through energy performance contracts and through capital and maintenance budgets.
- Building managers will continue to use the Energy Consumption Recording System to compare their consumption with other buildings and take operating and maintenance actions if warranted.
- Two groups of buildings and three large buildings are planned to receive major retrofits. The buildings are: Red Deer and Area Buildings Group; North Central Buildings Group; and Edmonton Courthouse, Remand Centre, and Brownlee Building.
- The Terrace Building Computer Center is to close within the year. The central plant provides chilled water year round to support this and some minor cooling at the Legislature. If the central water plant is shut down in winter, a free cooling (air-cooled) system is required for the Legislature. The capital cost of this project will be \$150,000 with operational cost savings of \$80,000 per year. This will result in a payback in 1.9 years.
- The Legislature Annex boilers are marginal in capacity, in poor condition, and have been housed in a temporary building since 1982. The Haultain Heating Plant is contracted out. The Central Steam Plant has considerable excess capacity and could pick up these loads with the gas utility being the primary transferred cost. The capital cost of the project would be \$300,000 with operational savings of \$100,000 per year. The payback period would be 3 years.
- A Water Recirculation Feasibility Study, at the Cold Lake Fish Hatchery, was performed in 1996. The cost-effective option was to recirculate 25% (1,000 GPM) from the early rearing and trout tanks. Environmental Protection supports the project. The capital cost of the project would be \$95,000 with operational cost savings of \$42,500. This would make the payback period 2 years.
- An energy study will be conducted on the Legislature Building to identify energy saving measures. Those measures which prove to be feasible and do not impact the historic nature of the building would be implemented.
- Environmental concerns will be integrated into specifications for major civil works projects. These specifications deal with the protection of the natural and cultural environment, waste handling, and environmental emergencies. The specifications will require the recycling of engine oils and encourage reuse or recycling of all construction materials. It is also will require that all project personnel must take environmental training provided by the department's on-site environmental inspector.
- Reservoir projects that provide sufficient physical capability have been designed to accommodate the retrofit of hydroelectric turbines. Some turbines have been installed and others are being investigated at several sites in the province. In some cases, projects have been designed to accommodate future

uses that will result in energy savings. For example, an outlet structure is being provided at the Pine Coulee Reservoir to permit gravity-head irrigation water supply to nearby farms and municipal water supply to the Town of Claresholm. This will reduce the pumping costs and energy use for the irrigation farmers and pumping and water treatment costs for the town.

- The provincial government has an ongoing program to remove, consolidate, and privatize fuel supply systems. This reduces environmental risks, removes contamination, and produces a more efficient fuel delivery system.
- Provincially owned contaminated sites are also being cleaned up. The sites include those the province has acquired within the Transportation and Utilities Corridors around Edmonton and Calgary, and salt-contaminated highway maintenance yards.
- The landscape sections of the design guidelines for government owned buildings encourage low maintenance landscaping and landscape design that reduces heating and cooling energy use for associated buildings.
- The provincial government is co-operating with Natural Resources Canada at the Devon Western Research Centre to install a micro-turbine.
- A display has been produced and offered to departments for use in the lobbies of their buildings. The display promotes the profile among staff of the Alberta government climate change action plan and encourages specific greenhouse gas emission reduction actions.
- Alberta Environmental Protection's Action on Waste is planning, budget permitting, that follow-up waste audits will be conducted on those government facilities that were audited in the spring of 1996. The 1996 study was

designed to collect baseline waste data.

- The Alberta Used Oil Recycling program became a regulated, province-wide program in September 1997. Over 20 drop-off "EcoCenters" for the collection of used oil, filters, and oil containers have been established to date, with others planned throughout Alberta.
- An interdepartmental working group has been formed to develop a policy on working at home.
- Alberta Environmental Protection, Labatt Breweries Prairie Region, and the Junior Forest Wardens are running a tree planting program June 15th to September 1st, 1998. The Wildcat planting program will help replant the fire ravaged parts of Alberta.

6.0 Conclusion

The Alberta Government is taking leadership by reducing its own greenhouse gas emissions. A target of 14.1 per cent reduction (74 kilotonnes CO₂ equivalent) from 1990 levels by the year 2000 has been established. Actions have been taken to meet this target.

In 1997, total emissions of CO₂ equivalent from all government operations decreased from 476 kilotonnes in 1996 to 449 kilotonnes of CO₂ equivalent in 1997, a 5.7 per cent reduction. These reductions exceed the target of 488 kilotonnes of CO₂ equivalent set for 1997. All three sources of emissions contributed to these reductions. The reductions from each source were: buildings, 26 kilotonnes; waste, 1 kilotonne; and transportation, 0 kilotonnes.

The 1997 emissions of 449 kilotonnes of CO₂ equivalent are 14.6 per cent below 1990 levels. The reductions exceed our 1997 target and our

overall target for 2000 of 452 kilotonnes of CO₂ equivalent by 3 kilotonnes of CO₂ equivalent.

In summary, the targets set for 1997 have been surpassed, although some of these emissions have probably been transferred to the private sector. Greenhouse gas emissions have gone down 27 kilotonnes through energy efficiency initiatives, employee education programs and downsizing of

government. A cross-government team is implementing actions with support from senior executives. A baseline has been established, performance measures chosen, and targets set. Actions are showing results and these results will be monitored, assessed and reported on in future progress reports.